Indiana Department of Transportation

SR 37 EA/CORRIDOR STUDY
from Noblesville to Marion

PURPOSE & NEED STATEMENT

ENGINEERS
PLANNERS
ECONOMISTS
Wilbur Smith Associates

WOOLPERT

TABLE OF CONTENTS

TABLE OF CONTENTS 1

SECTION 1 - INTRODUCTION 2

1.1 STUDY AREA 3
1.2 INDOT 2000-2025 LONG RANGE PLAN 3
1.2 EXISTING HIGHWAY NETWORK 4
1.3 HISTORY / CONDITION OF EXISTING INFRASTRUCTURE 5
1.4 PROJECT HISTORY AND PREVIOUS STUDIES OF THE CORRIDOR 6

SECTION 2 - STUDY AREA TRENDS AND FORECASTS 9

2.1 POPULATION TRENDS AND FORECASTS 9
2.2 DEVELOPMENT TRENDS AND FORECASTS 10

SECTION 3 - CRASH ANALYSIS 11

SECTION 4 - CAPACITY ANALYSIS 14

SECTION 5 - PURPOSE AND NEED 20

5.1 PROJECT NEED STATEMENT 20
5.2 PROJECT PURPOSE STATEMENT 20

APPENDIX OF FIGURES 21

SECTION 1 - INTRODUCTION

The Indiana Department of Transportation (INDOT), in cooperation with the Federal Highway Administration (FHWA), has undertaken this Purpose and Need Statement for the SR 37 Environmental Assessment / Corridor Study in accordance with the following:

- National Environmental Policy Act (NEPA) of 1969
- INDOT's Streamlined Environmental Impact Statement (EIS) Procedures (approved July 6, 2001)
- FHWA Indiana Division Section 106 (historic) Consultation Procedures (approved August 7, 2001)

This Purpose and Need Statement defines the "need" (deficiencies) for a proposed action by addressing the following questions:

- Why are real or perceived deficiencies a problem and what facts support the existence of the problem?
- Why is the problem occurring here and not somewhere else, and why are we only addressing the problem here?
- Why does the problem need to be addressed now, and what could happen if the problem is not addressed now?

This document then defines a broad corrective action ("purpose") for each associated "need" by asking:

- What are the requirements?
- When will success be declared?
- What is the best measurement for success?

The SR 37 EA/ Corridor Study focuses on the segment of SR 37 from Noblesville to Marion in Hamilton, Tipton, Madison, and Grant counties. The intersections of SR 37 with SR 32/38 in Noblesville and SR 9 in Marion have been designated as the southern and northern termini, respectively. Each of these intersecting routes represent the most significant arterials connected to SR 37 in the vicinities of the two terminus cities.

The Transportation Equity Act for the 21st Century (TEA-21) deemed the SR 37 corridor to be a high Priority Project for the State of Indiana. Congress has thereby mandated that a study of improvements along SR 37 in Noblesville, Elwood, and Marion be commissioned.

1.1 Study Area

The study area, as depicted in **Figure 1.1.2 (Appendix of Figures)** is located between the cities of Noblesville and Marion, and is approximately 44 miles in length and includes Hamilton, Tipton, Madison, and Grant counties.

1.2 INDOT 2000-2025 Long Range Plan

INDOT has recently completed a Long Range Plan for Indiana's highway system. This Long Range plan will play a vital role in evaluating the alternatives for the SR 37 EA/Corridor Study. Part of the development effort of the 2000-2025 Long Range Plan involved analyzing the information from several other classification schemes to develop a new and simplified planning-level corridor classification scheme for statewide planning purposes. The INDOT Long Range Plan categorizes highway corridors into three separate classifications: Statewide Mobility, Regional, and Local Access Corridors. Each of these corridor types are described below.

Statewide Mobility Corridors

These corridors are the top-end of the highway system and are meant to provide mobility across the state. They provide safe, free flowing, high-speed connections between the metropolitan areas of the state and surrounding states. They serve as the freight arteries of the state and are thus vital for economic development. INDOT has a strategic goal to directly connect metropolitan areas of 25,000 population or greater.

Regional Corridors

The INDOT 2000-2025 Long Range Plan lists SR 37 between Indianapolis and Marion as a Regional Corridor. These corridors are the middle tier of the highway system and are meant to provide mobility within regions of the state. They provide safe, high-speed connections. The following list details the basic characteristics of a Regional Corridor.

- Mid-level design standards
- High to moderate speed
- Free-flow to the extent practicable in rural areas
- Serves medium distance trips
- Carry medium distance commuter traffic

- Moderate through volumes of traffic
- Moderate commercial vehicle flows
- Potential for heavy local traffic volumes
- Typically, at grade intersections with highways and railroads, with consideration for railroad separation
- High-level two-lane or multi-lane
- Partial access control desirable
- Conventionally routed through cities and towns
- Moderate interaction with non-motorized vehicles and pedestrians

Local Access Corridors

These corridors make up the remainder of the highway system. They are the bottom level of system and are used for lower speed travel, and provide access between location of short distances. (10-15 miles).

1.2 Existing Highway Network

The SR 37 EA/ Corridor study will focus on the area between SR 32/38 in Noblesville and SR 9 in Marion. The corridor is approximately 44 miles long. The existing roadway at the southern end of the study area is a four-lane divided highway with full width (10 foot) shoulders from I-69 north 8 miles to Allisonville Road. SR 37 narrows to a two-lane highway just north of Allisonville Road in Noblesville and remains a two lane facility with 2 foot paved shoulders until it intersects SR 9. Traffic signals are present at the intersections of SR 32/38, 191st Street, 206th Street, SR 13 (north junction), SR 28, U.S. 35 / SR 22, and SR 9. Additionally the intersections of South P Street in Elwood, SR 26, and County Road 300 South in Grant County are four-way stops with flashing beacons. Details on each of these intersections are included in **Table 1.2.1**. Left turn lanes on SR 37 have been added at several of the intersections with signals or flashing stop signals. Additionally, Norfolk Southern owns a railroad which crosses SR 37 in Elwood, between South P Street and SR 28. The posted speed along the corridor is 55 mph with the exception of the areas through Clare (just north of 206th Street) and Elwood (South P Street to County Road 700 West) where the posted speed limit is 45 mph.

Table 1.2.1
Summary of Intersections

Location	Type
SR 32 / 38	Signal with 4-Way Left Turn
191st Street	Signal with Left Turn for SR 37
206th Street	Signal
SR 13 (north junction)	Signal
South P Street (Elwood)	Flashing - All way stop
SR 28	Signal with 4-Way Left Turn
SR 26	Flashing - All way stop
U.S. 35 / SR 22	Signal
County Road 300 S (Grant Cty)	Flashing - All way stop
SR 9	Signal with 4-Way Left Turn

The adjacent land use is primarily farmland, with scattered residential and business development. With only a few exceptions, businesses adjacent to the highway are located within the Corporate City Limits of Noblesville, Elwood, and Marion. These businesses vary from small restaurants, motels, and car dealerships to large manufacturing corporations. Two of the largest businesses near the SR 37 corridor are Red Gold Incorporated and Elsa Corporation. Together, these two businesses employ 1600 individuals, and are both located near Elwood. Several residential neighborhoods are also located within the cities mentioned above, and throughout several small unincorporated towns along the corridor such as Clare, Strawtown, and Rigdon. The remaining residential areas are scattered, low-density, single family homes or farm houses. Additionally, several schools are located on or near SR 37, and both Marion and Elwood have airports directly adjacent to the corridor.

1.3 History / Condition of Existing Infrastructure

SR 37 was originally constructed in the mid 1920's between Marion County and the southern corporation line of Noblesville as a two-lane, 20 foot wide concrete paved road. The concrete roadway was then extended north to the Madision / Grant County line in the late 1930's, and continued to SR 9 as a bituminous pavement roadway in 1940. Since that time, several resurfacing, reconstruction, widening, maintenance, and intersection improvement projects have been completed on the roadway. Based on a cursory inspection of the roadway condition, the pavement between Noblesville and Elwood appears to be in fair to good condition. The pavement through Elwood is in fair condition, with the pavement in the intersections showing the greatest need for repair. One section of pavement north of Elwood, between U.S. 35 / SR 22 and Marion Corporate Limits is in need of rehabilitation because of deterioration at the edge of pavement. Several bridges (spans over 20 feet) and small drainage structures are also located along this corridor. The largest structure is located over the White River in Strawtown, and it is in good condition, as this bridge was built in

1976 and rehabilitated in 1999. No obvious deficiencies were noted in the INDOT inspection reports.

Visible Roadway Deficiencies

The most noticeable roadway deficiencies exist just north of Noblesville and through the town of Clare where vertical and horizontal alignment problems are present. Sight distance at the intersections of SR 37 with 206th Street, 211th Street, and Clare Avenue appears to be minimal, most likely due to substandard vertical alignment. The horizontal alignment in this area also appears substandard. However, physical constraints (i.e. the White River and nearby terrain) would make it very difficult to improve the horizontal alignment without realigning the entire roadway. The intersections at Strawtown Road and 246th Street also appeared to have intersection sight distance dificiencies. **Figure 1.3.1** illustrates the areas of known stopping and intersection sight distance issues were noticed.

Programmed Improvements

The INDOT 2000-2025 Long Range Plan includes several programmed improvements for the SR 37 Corridor, which are detailed in Table 1.2.1 of the *Preliminary Alternatives Document*. Such improvements will aid in creating the "No-Build" Alternative, against which all other alternatives will be compared in this study.

1.4 Project History and Previous Studies of the Corridor

Since 1990, four independent studies have been performed on various portions of the corridor by several different agencies, with varying recommendations for improvements. Sections 1.4.1 through 1.4.4 summarize each study and recommendations.

The State of Indiana (INDOT) began examining the SR 37 corridor in 1990, after a request from several state representatives and senators. The impetus behind this request was the desire to promote economic development along the corridor and the idea that the addition of travel lanes to SR 37 would make this area of the state more accessible.

A proper adjustment of the existing SR 37 design could reduce or remove development disincentives related to transportation by decreasing vehicle operating costs and travel times, and reducing the likelihood of crashes. The corridor study completed by INDOT in 1990 concluded that improvements in the form of a four-lane divided highway were not warranted. However, the study evaluated in detail only one alternative, expanding the roadway to four lanes.

In 1994, the **SR 37 Highway Improvement Task Force, submitted by the Madison County Council of Governments along with local city and county officials from Hamilton,**

Madison, and Grant Counties wrote a report, *State Road 37: Corridor Improvement Project*, that expressed the belief that improvements would result in greater accessibility to the Indianapolis region for a larger and more diversified business and service sector. The three counties making up the task force were Hamilton, Madison and Grant counties, three of the four counties included in this corridor study. As the economic and industrial composition analysis of that report shows, these counties have begun the transition from a manufacturing-based economy to a more diversified economic system. These three counties also face the issue of a growing number of individuals commuting between communities for work.

The **Indiana Economic Development Council** put together the *East Central Indiana Comprehensive Development Strategy* in 2000 and included seven counties in the region. Grant and Madison counties were included in those seven, although Hamilton was not. The authors of that study have determined that the East Central region is strongly interconnected and commuting patterns suggest that this is a regional labor market area. The commuting data also suggests that residents are commuting to and from neighboring communities as well as from Indianapolis, Kokomo and Fort Wayne. Because of both the economic and transportation issues facing the region, the Council believes that part of the economic development strategy should be to widen SR 37 from two lanes to four lanes, from Marion to Noblesville, and make this a priority for the region.

1.4.1 SR 37 Added Travel Lanes Study prepared by INDOT

Year Performed: 1990

Reason for Study: Requested by the Indiana House of Representatives and Senate (House Concurrent Resolution 60) to study the feasibility of widening SR 37 from two-lanes to four-lanes between Noblesville and Marion. Primary intent of the study was to determine if the upgrade of SR 37 would promote economic development along the corridor.

Study Limits: Just north of Noblesville to SR 9.

Method: The corridor was broken up into six segments and each was evaluated separately. As a part of the study, the benefits resulting from the improvement of each section were evaluated and scored on 5 separate categories: safety, capacity, geometrics, functional classification, and socioeconomics/ public input. These benefits were then weighed against the costs associated with construction, preliminary engineering, construction engineering, as well as contengencies to determine the overall feasibility of the study.

Findings: Construction of a four-lane divided highway was found to be warranted only in the southern section of the corridor (Allisonville Road to SR 213). The remaining segments were found to be functioning without the need for additional travel lanes, and therefore, the construction of additional lanes was not recommended. Only minor planned improvements were suggested north of SR 213.

1.4.2 SR 37: Corridor Improvement Study prepared by the SR 37 Highway Task Force

Year Performed: 1994

Reason for Study: To study the feasibility of upgrading an existing two-lane facility into a four-lane limited access thoroughfare.

Study Limits: From north of Noblesville (Strawtown) to Marion.

Method: The study analyzed ADT volume counts, accident data, and development trends within the corridor boundaries to determine the feasibility of upgrading SR 37.

Findings: The analysis of traffic counts and accident data verified the need for expansion due to congestion in the southern portion of the corridor. Additionally, the study concluded that growth trends along the corridor are such that the central and northern sections of SR 37 should be upgraded to prevent future construction limitations associated with the progression of development along the corridor.

1.4.3 I-69 / SR 37 Major Investment Study (MIS) prepared by The Corradino Group, Sponsored by INDOT

Year Performed: 1996

Reason for Study: To study possible solutions to highway congestion brought on by rapid growth in northeastern Marion County and southern Hamilton County.

Study Limits: I-465 north leg from SR 431 (Keystone Avenue) east to I-69, I-69 from I-465 north to SR 238, and SR 37 from I-69 north to just beyond SR 213

Method: The study involved local agencies and communities, environmental resources, and a traffic forecasting model in order to determine the best fit alternatives for each section of highway.

Findings: The analysis for SR 37 (within the limits of the current study) found a four-lane divided highway, realigned between Allisonville Road (2.38 miles north of SR 32) and Strawtown Road (1.76 miles south of SR 213) to be the most feasible alternative.

1.4.4 Northeast CONNECTIONS Major Investment Study (MIS)/ Draft Environmental Impact Study (DEIS) being prepared by Parsons, Brinckerhoff, Quade & Douglas, Inc. Sponsored by The Indianapolis MPO

Years Performed: 1997-Present

Study is not yet completed. Four possible highway improvement alternatives remain for consideration. The most likely highway alternative would upgrade the present 4-lane facility to a 6-lane expressway (non-freeway) on SR 37 from I-69 to just north of Noblesville. After completion of the MIS/Draft EIS, a final EIS for the highway elements will be sponsored by INDOT.

SECTION 2 - STUDY AREA TRENDS AND FORECASTS

2.1 Population Trends and Forecasts

Recent population trends for the SR 37 study corridor are displayed in **Table 2.1.1**. The region has a total 2000 population of 406,321. Between 1980 and 2000, the region's population has increased steadily by 27.6 percent. The population projection for the study corridor for the year 2025 is about 17 percent higher than the population in 2000. Only two of the four counties, Hamilton and Tipton, experienced positive population growth in the twenty-year period between 1980 and 2000.

Hamilton County's population, which includes Noblesville, was the only county to grow, by over 122 percent, from 82,027 to 182,740 between 1980 and 2000. Hamilton County is projected to continue its growth by about 38 percent between 2000 and 2025. Grant County's population declined between 1980 and 2000 by over 9 percent. Grant County is expected to sustain a small decrease in its population between 2000 and 2025 of about 3 percent. Madison County's population decreased slightly more than 4 percent between 1980 and 2000. Madison County is projected to maintain its population between 2000 and 2025. Tipton County's population increased slightly more than 3 percent between 1980 and 2000. Tipton County is projected to continue its growth by nearly 6 percent between 2000-2025.

The population of the four counties within the study corridor is expected to be 474,769 by the year 2025. This is approximately an increase of 17 percent between 2000 and 2025. Hamilton County is predicted to have a net population increase between 2000 and 2025. The population percentage change in the counties within the study corridor is higher than that of the population growth rate of the state of Indiana and lower than that of the nation as a whole. During the same period, 1980-2000, in which the region had a net population increase of 27.6%, the state population grew 10 percent and the population of the entire nation grew 21 percent. This trend of population increases is expected to continue between 2000 and 2025.

Table 2.1.1
Population Trends and Forecasts
by County, Region, State, and Nation—1980-2025

				Projected		Percent Change	
	1980	1990	2000	2010	2025	1980-2000	2000-2025
Grant	80,934	74,169	73,403	72,405	70,578	-9.3%	-3.8%
Hamilton	82,027	108,936	182,740	208,296	253,251	122.8%	38.6%
Madison	139,336	130,669	133,358	133,584	133,120	-4.3%	0.0%
Tipton	16,240	16,140	16,820	17,180	17,820	3.6%	5.9%
Region	318,537	329,914	406,321	431,465	474,769	27.6%	16.8%
Indiana (000's)	5,490	5,544	6,080	6,318	6,645	10.7%	9.3%
Nation (000's)	226,546	248,791	274,520	299,228	336,348	21.2%	22.5%

Note: 2000 data based on population estimates.

Sources: U.S. Bureau of the Census; State and county projections from Indiana University Kelley School of Business, Indiana Business Research Center, http://www.stats.indiana.edu/web/county/projections/99county-projections.html.

2.2 Development Trends and Forecasts

Development within the SR 37 study area has been focused in recent years almost exclusively in those areas adjacent to SR 37. A few shopping centers have been constructed in communities along the route using a large national retail store as an anchor for complementary retail and service businesses. Outside of these communities, agriculture dominates the activity along SR 37. A very small number of businesses are located along these unincorporated stretches of the road.

In Noblesville, recent commercial, financial and industrial development south of the SR 32/SR 37 intersection is unprecedented. Noblesville is currently planning a mixed-use industrial and commercial park in this southern area along SR 37. Most recently, a German tool-manufacturing company, Index Corp., has decided to relocate its North American headquarters to southern Noblesville along SR 37. This recent surge in development combined with hospital, commercial and office development on SR 32 in western Noblesville has significantly changed the face of this community.

In Elwood, new development along SR 37 has occurred most recently between SR 13 and SR 28. This is where Plastech and ELSA industries are located, as well as a shopping center. Within one mile west of the SR 28 and SR 37 intersection, limited commercial development has occurred on SR 28, including a few restaurants and small stores. Recent economic development efforts have focused on the SR 28 and SR 37 intersection. Here, mixed industrial and commercial activities are being sought.

In Marion, SR 37 terminates by merging into SR 9 at the southern edge of the community just north of the Marion Municipal Airport. A few commercial and financial businesses are located at this terminus. However, all varieties of service, financial, retail, entertainment, and industrial establishments line both sides of the road along SR 9 through Marion.

There are a number of large employers that are not located along SR 37 that have added greatly to the local economy. In Noblesville, one of the largest employers in Hamilton County, Riverview Hospital, is located along SR 32. The hospital is owned by the county and employs over 650 people. Red Gold Inc., one of the country's top tomato product producers, employs over 200 in Elwood and around 350 in Orestes, just outside of Elwood. In western Marion, General Motors employs over 1,600 at its Metal Fabricating Division. On the north side of Marion, Thomson Consumer Electronics employs over 2,400 workers.

SECTION 3 - CRASH ANALYSIS

Years of Analysis

The crash analysis used both crash and average annual daily traffic (AADT) information throughout the study limits from the years 1997 to 1999.

Methodology

In order to identify problem areas, the corridor was broken up into 6 segments based on noticeable changes in facility type (i.e. two-lane or four-lane), AADT, and adjacent land use / demographics. **Table 3.0.1** and **Figure 3.0.1** illustrate the segments used for the crash analysis:

Table 3.0.1
Description of Segments for Crash Analysis

Segment	Description	Length (miles)
A	SR 32/38 to 0.96 mile north of 191st Street (Four-Lane Divided Highway)	3.34
B	0.96 mile north of 191st Street to 1.55 miles north of SR 213	6.81
C	1.55 miles north of SR 213 to 1.85 miles north of SR 128	10.44
D	1.85 miles north of SR 128 to 2.94 miles north of SR 28	7.14
E	2.94 miles north of SR 28 to 1.74 miles north of SR 26	10.30
F	1.74 miles north of SR 26 to SR 9	5.76

Crash rates are measured on the number of crashes per 100 million vehicle miles of travel (VMT). The daily VMT for each segment was found by multiplying the length of each segment by the AADT shown in the INDOT AADT History File Listing. Maximum, minimum, and average VMT were calculated using the various AADT information available within each segment. The daily VMT was then converted to VMT per year. Since the ADT counts assume weekday flows, which are typically higher than weekend traffic flows, an adjustment must be made when determining the total traffic volume in a given year. In order to compensate for reduced weekend flows in the, a 6 day week (rather than a 7 day) was utilized in the conversion from VMT to VMT per year. The fatal, injury, and property damage only crash rates were calculated by dividing the number of accidents by the VMT of each segment.

Results

Tables 3.0.2a, 3.0.2b, and 3.0.2c summarize the results of the crash analysis. The rates included in these tables represent the most conservative (highest) crash rates, determined from the lowest AADT for any given section of roadway within a segment.

Table 3.0.2a
Fatal Crash Rates per 100 Million Vehicle Miles of Travel 1997-1999
(1997-1999 Statewide Average for Rural Minor Arterials = 2.03)

Segment	1997	1998	1999	3 Year Avg.
A	0.0	0.0	0.0	0.0
B	0.0	0.0	5.6	1.9
C	0.0	7.3	0.0	2.4
D	0.0	0.0	0.0	0.0
E	0.0	7.3	0.0	2.4
F	0.0	12.5	0.0	4.2
Entire Corridor	0.0	4.5	0.9	1.8

Sources: INDOT AADT History File Listing and Crash Reports

: Fatal crash rate of exceeds Statewide average.

Table 3.0.2b
Injury Crash Rates per 100 Million Vehicle Miles of Travel 1997-1999
(1997-1999 Statewide Average for Rural Minor Arterials =56.17)

Segment	1997	1998	1999	3 Year Avg.
A	9.6	125.1	80.8	71.8
B	62.7	67.6	61.8	64.0
C	49.1	44.1	44.0	45.7
D	107.7	42.1	120.0	89.9
E	0.0	29.2	65.2	31.5
F	91.6	37.5	94.6	74.5
Entire Corridor	53.4	57.6	77.7	62.9

Sources: INDOT AADT History File Listing and Crash Reports

: Injury crash rate exceeds Statewide average.

Table 3.0.2c
Prop. Damage Crash Rates per 100 Million Vehicle Miles of Travel 1997-1999
(1997-1999 Statewide Average for Rural Minor Arterials = 164.72)

Segment	1997	1998	1999	3 Year Avg.
A	66.9	95.7	95.5	86.0
B	112.9	107.0	269.7	163.2
C	45.0	40.4	47.6	44.3
D	193.8	168.4	96.0	152.7
E	104.5	7.3	93.2	68.3
F	143.9	174.9	157.6	158.8
Entire Corridor	111.2	98.9	126.6	112.2

Sources: INDOT AADT History File Listing and Crash Reports

The fatal crash rates for segments C, E, and F exceed the statewide average, but no specific trends such as collision type, location, or vehicle action are apparent. Each of the fatalities occurred at different locations and under different conditions.

Segments A, B, D, and F exceed the statewide average for injury crash rates. All of these segments are located in or near the Corporate City Limits of Noblesville, Elwood, or Marion, where major crossroads (potential conflicting vehicular movements) are more prominent. There is no apparent correlation to elevated injury crash rates and type of facility (i.e. two-lane or four lane).

The property damage only crash rates are below the statewide average throughout the entire corridor. As with the injury crash rates, a trend of increased crash rates through higher developed areas (Segment B, D, and F) was noticed. However, the four-lane portion of SR 37 near Noblesville (Segment A) had a much lower property damage only crash rate than the two-lane section

Conclusion

Portions of the corridor exhibit fatality and personal injury crash rates that exceed the statewide averages for this type of facility.

SECTION 4 - CAPACITY ANALYSIS

Methodology

The capacity analysis for the SR 37 corridor was based on methodologies contained within the 2000 Highway Capacity Manual, Special Report 209 (HCM2000) and the accompanying Highway Capacity Software (HCS2000). The analysis focused on roadway segments and not individual intersections along the corridor.

With the exception of the extreme southern portion of the study area (SR 32 / SR 38 north 2.38 miles to Allisonville Road), SR 37 is a 2-lane facility. The segments investigated are based on those in INDOT's Annual Average Daily Traffic County Flow Maps (broken down by points of a 10 percent change in ADT). The average annual daily traffic (AADT) were based on the most recent traffic coverage counts collected by INDOT. Hamilton County traffic counts were collected in 1998 and Madison and Grant County traffic counts were obtained in 1999. The ADT was extrapolated to 2001 and 2025 levels using growth rates derived from INDOT's traffic history tape. (The history tape is a compilation of actual traffic counts and projections for each segment of roadway under the jurisdiction of INDOT. Through regression analysis, an annual growth rate was derived from the actual traffic counts for each segment.) The SR 37 segment descriptions along with the 2001 base and 2025 horizon year AADT's are presented in **Table 4.0.1**.

Both the morning and afternoon peak hours were determined from the INDOT traffic counts. It was found that the morning peak hour started at 7 a.m. while the afternoon peak hour began at 5 p.m. These patterns correspond well to the commuting nature of the communities along the corridor. The Levels of Service (LOS's) for each segment were assessed for both AM and PM peak periods. The 2001 base and 2025 horizon years LOS's are presented in **Table 4.0.2**. and **LOS Illustrations (Appendix of Figures)**

Table 4.0.1
SR 37 Segment and AADT Summary

Segment Description			2001 Estimated AADT	2025 Estimated AADT
Segment Limits	INDOT Segment	County		
SR 32 / SR 38 to 186th Street (4-lane)	4H	Hamilton	21,270	37,020
186th Street to 191st Street (4-lane)	5H	Hamilton	21,200	39,530
191st Street to 216th Street (4-lane)	6H	Hamilton	14,670	26,680
191st Street to 216th Street (2-lane)	6H	Hamilton	14,670	26,680
216th Street to Strawtown Pike	7H	Hamilton	14,080	21,420
Strawtown Pike to SR 213	8H	Hamilton	11,670	19,630
SR 213 to SR 13	9H	Hamilton	8,940	14,820
SR 13 to 281st Street	4D	Hamilton	10,130	17,090
281st Street to Madison County Line	5D	Hamilton	9,640	16,130
Hamilton County Line to CR 1000N	9E	Madison	9,390	14,030
CR 1000N to SR 13	10E	Madison	7,395	13,325
SR 13 to South P Street	1K	Madison	5,460	7,630
South P Street to SR 28	2K	Madison	7,620	11,050
SR 28 to Grant County Line	3K	Madison	4,420	5,480
Madison County Line to SR 26	1M	Grant	3,440	4,650
SR 26 to SR 22 / US 35	2M	Grant	3,620	5,010
SR 22 / US 35 to 50th Street	3M	Grant	4,550	5,260
50th Street to SR 9	4M	Grant	5,640	6,510

Table 4.0.2
Capacity Analysis Summary for SR 37

Segment Description	INDOT Segment	Base Free Flow Speed (mph)	Percent No Passing Zones	2001 LOS*	2025 LOS*
SR 32 / SR 38 to 186th Street (4-lane)	4H	60	4-Lane	B/B	C/C
186th Street to 191st Street (4-lane)	5H	60	4-Lane	B/B	C/D
191st Street to 216th Street (4-lane)	6H	60	4-Lane	A/A	B/B
191st Street to 216th Street (2-lane)	6H	60	100	D/D	E/F
216th Street to Strawtown Pike	7H	60	50	D/D	E/E
Strawtown Pike to SR 213	8H	50	100	E/E	E/E
SR 213 to SR 13	9H	60	50	C/C	D/D
SR 13 to 281st Street	4D	60	10	C/C	D/D
281st Street to Madison County Line	5D	60	10	C/C	D/D
Hamilton County Line to CR 1000N	9E	60	50	C/D	D/D
CR 1000N to SR 13	10E	60	50	D/E	D/F
SR 13 to South P Street	1K	50	100	D/E	E/E
South P Street to SR 28	2K	50	100	E/E	E/E
SR 28 to Grant County Line	3K	60	10	A/B	B/B
Madison County Line to SR 26	1M	60	10	B/B	B/B
SR 26 to SR 22 / US 35	2M	60	10	B/B	B/B
SR 22 / US 35 to 50th Street	3M	60	10	B/B	B/B
50th Street to SR 9	4M	50	10	D/D	D/D

Assumptions: 12-foot lanes
8-foot shoulders (6-foot shoulders for 4-lane segments)
Peak Hour Factor = 0.90

Shaded LOS : Roadway Segment with LOS Lower than "C"

* : X / X = AM Peak LOS / PM Peak LOS

Results

Base year (2001): SR 37 south of 191st Street, where it is 4-lanes, performed satisfactorily with levels of service (LOS) "C" or above. However, north of 191st Street, where SR 37 is only 2 lanes, the corridor experienced unsatisfactory LOS, below "C". Between 191st Street and SR 213 (Segments 6H, 7H, and 8H), the overall LOS was essentially "D" and "E".

North of SR 213, the LOS's improve to "C" until the Madison/Hamilton County line, where the LOS's begin to deteriorate to "D" and "E" northward to Elwood. In the areas near CR 1000 North and SR 28 (Segments 9E, 10E, 1K, and 2K), the LOS's decline to unsatisfactory levels due high traffic volumes during the AM and PM peak periods which correspond to the commuting and working environment of the Elwood area. In addition, segments 1K and 2K were analyzed with

the free-flow speed estimated to be 50 miles per hour. This is lower than the free flow speed of 60 mph used for the majority of the SR 37 corridor, due to the reduced posted speed through Elwood.

North of the SR 28 intersection in Elwood, the LOS improve significantly to "A" and "B." This is basically due to the relatively low daily and peak period traffic volumes encountered.

2025: The existing SR 37 roadway network with 2025 traffic demand has results that pattern after the 2001 scenario but with lower levels of service throughout the corridor. Favorable LOS ("C" or higher) were found in the south portion of the corridor where SR 37 is presently 4-laned (segment 5H PM peak hour being an exception) and in segments north of SR 28 from Elwood to Marion. Overall, the 2025 LOS basically deteriorates to the next lower service level found in the 2001 scenario, especially south of SR 28.

The LOS for two-lane roads, as outlined in the methodology of the HCM2000, is controlled by what is known as the "Average Travel Speed" and the "Percent Time Spent Following." Average travel speed reflects mobility of a two-lane highway. It is defined as the length of the roadway segment divided by the average travel time of all vehicles traversing the segment in both directions in designated analysis period such as a peak hour. Percent time spent following represents the freedom to maneuver and the comfort and convenience of travel. It is the average percentage of travel time that vehicles must travel in platoons behind slower vehicles due to the inability to pass.

A sensitivity check was conducted on 2-lane segments for which average travel speed and percent no passing zones could be improved. **Table 4.0.3** displays the changes made to segments and the resulting LOS. The remaining 2-lane segments were not changed since the variables involved were at near favorable settings.

Table 4.0.3
Capacity Analysis Summary for Modified 2 – Lane Segments

Segment Description	INDOT Segment	Base Free Flow Speed (mph)	Percent No Passing Zones	2001 LOS*	2025 LOS*
191st Street to 216th Street	6H	60	**25**	**D/D**	**E/F**
216th Street to Strawtown Pike	7H	60	**25**	**D/D**	**E/E**
Strawtown Pike to SR 213	8H	**60**	**25**	**D/D**	**E/E**
SR 213 to SR 13	9H	60	**25**	**C/C**	**D/D**
SR 13 to 281st Street	4D	60	10	C/C	D/D
281st Street to Madison County Line	5D	60	10	C/C	D/D
Hamilton County Line to CR 1000N	9E	60	**25**	**C/C**	**D/D**
CR 1000N to SR 13	10E	60	**25**	**C/C**	**D/D**
SR 13 to South P Street	1K	**60**	**25**	**B/C**	**C/C**
South P Street to SR 28	2K	**60**	**25**	**D/D**	**D/E**
SR 28 to Grant County Line	3K	60	10	A/B	B/B
Madison County Line to SR 26	1M	60	10	B/B	B/B
SR 26 to SR 22 / US 35	2M	60	10	B/B	B/B
SR 22 / US 35 to 50th Street	3M	60	10	B/B	B/B
50th Street to SR 9	4M	**60**	10	**B/B**	**B/B**

Bold values indicate modified parameters for 2-lane roadway

Assumptions: 12-foot lanes
8-foot shoulders
Peak Hour Factor = 0.90

Shaded LOS : Roadway Segment with LOS Lower than "C"

* : X / X = AM Peak LOS / PM Peak LOS

For the average travel speed, HCS2000 allows a range of 45 to 65 miles per hour. The average travel speed is a result from adjustments made to the base free flow speed; the adjustments are influenced by the number of access points per mile, lane and shoulder width, and the percent no passing zones. Most of the SR 37 corridor within the study limits is posted with a 55 mile per hour limit. In these segments, a 60 mile per hour base free flow speed was used in the analysis since most motorists travel at least higher than the posted limit. However, in other segments of the study area, such as in the vicinity of Strawtown, Elwood and Marion, 45 mile per hour speed limits exist. A 50 mile per hour base free flow speed was used in these areas. This reduction in analysis speed directly effected the outcome of the LOS; as much as a one to two LOS grade reduction was observed as displayed in **Tables 4.0.2** and **4.0.3**. Of all variables used as input for the capacity analysis, the average travel speed was the most sensitive since it is directly influenced to the LOS determination.

Another variable that was sensitive to the final LOS determination was the percent of no passing zones. If the percentage of no passing zones increased, the "percent time spent following" parameter would also increase. This would directly influence the deterioration of the LOS. In some segments such as 9E, 10E, 1K, 2K in Elwood as well as 4M in Marion, the reduction of no passing

zones helped to improve LOS. On other segments at the southern end of the study area (6H, 7H, 8H, and 9H), the reduction of no passing zones did not help reduce LOS since the existing peak hour volumes were relatively high. These high volumes and associated service flow rates were more critical in influencing "percent time spend following" and hence, LOS.

In addition, the peak hour factor (PHF) was another input variable that could influence LOS determination. In this analysis, a PHF of 0.90 was used. It was used as a default and represents a reasonable and realistic factor for a corridor that traverses urban, suburban, and rural areas. It was observed that in some cases, the LOS would deteriorate if the PHF went below 0.85.

Other input variables such as lane width, shoulder width, percentage of trucks/buses/ recreational vehicles and access point density did not prove to be as sensitive in determining the final LOS. The average travel speed, the percentage no passing zones and the existing peak hour traffic volumes had more of a controlling influence.

Conclusion

Currently, several segments of the existing SR 37 corridor experience unacceptable levels of service. Segments between 191st Street and SR 213 experience levels of service in the D to E range during peak hours. Additionally, the segments in southern Madison County and from SR 13 (north junction) to SR 28 near Elwood also experience levels of service in the D to E range. All other segments, except for one segment form 50th Street to SR 9 near Marion, have acceptable levels of service ranging from A to C. For the year 2025 traffic projections, all segments between 186th Street and SR 28 experience unacceptable levels of service in the D to F range. North of SR 28, the levels of service are consistently B, except for the 1000-foot segment from 50th Street to SR 9 near Marion, which experiences level of service D. This indicates traffic problems at the intersection of SR 37 and SR 9.

Based on the 2001 and 2025 traffic scenarios, capacity improvements to SR 37 from 191st Street to SR 28 and from 50th Street to SR 9 in Marion would be needed to improve SR 37's travel efficiency. This could include a range of possibilities through these segments, from standard two-lane cross section elements with enhanced passing opportunity to added through travel lanes.

SECTION 5 - PURPOSE AND NEED

5.1 Project Need Statement

Transportation improvements to the SR 37 corridor in Hamilton, Madison, and Grant counties between SR 32/38 in Noblesville and SR 9 in Marion are needed based on the following:

- The United States Congress named this study in the Transportation Equity Act for the 21st Century (TEA-21) as a High Priority Project for the State of Indiana.
- Portions of the corridor exhibit fatality and personal injury crash rates that exceed the statewide averages for rural minor arterials.
- Various sections of the existing corridor exhibit inadequate traffic capacity (i.e., LOS D or E) during the AM and/or PM peak hours for the base year (2001) and horizon year (2025), thereby limiting within the study limits.

5.2 Project Purpose Statement

Based on the identified needs for this corridor improvement study, the purpose of the SR 37 project is to:

- Satisfy the Congressional mandate.
- Reduce the crash frequency (risk).
- Provide a level of service C or better and provide system continuity within the project limits for forecasted traffic volumes for the year 2025.

APPENDIX OF FIGURES

APPENDIX OF FIGURES

TABLE OF CONTENTS

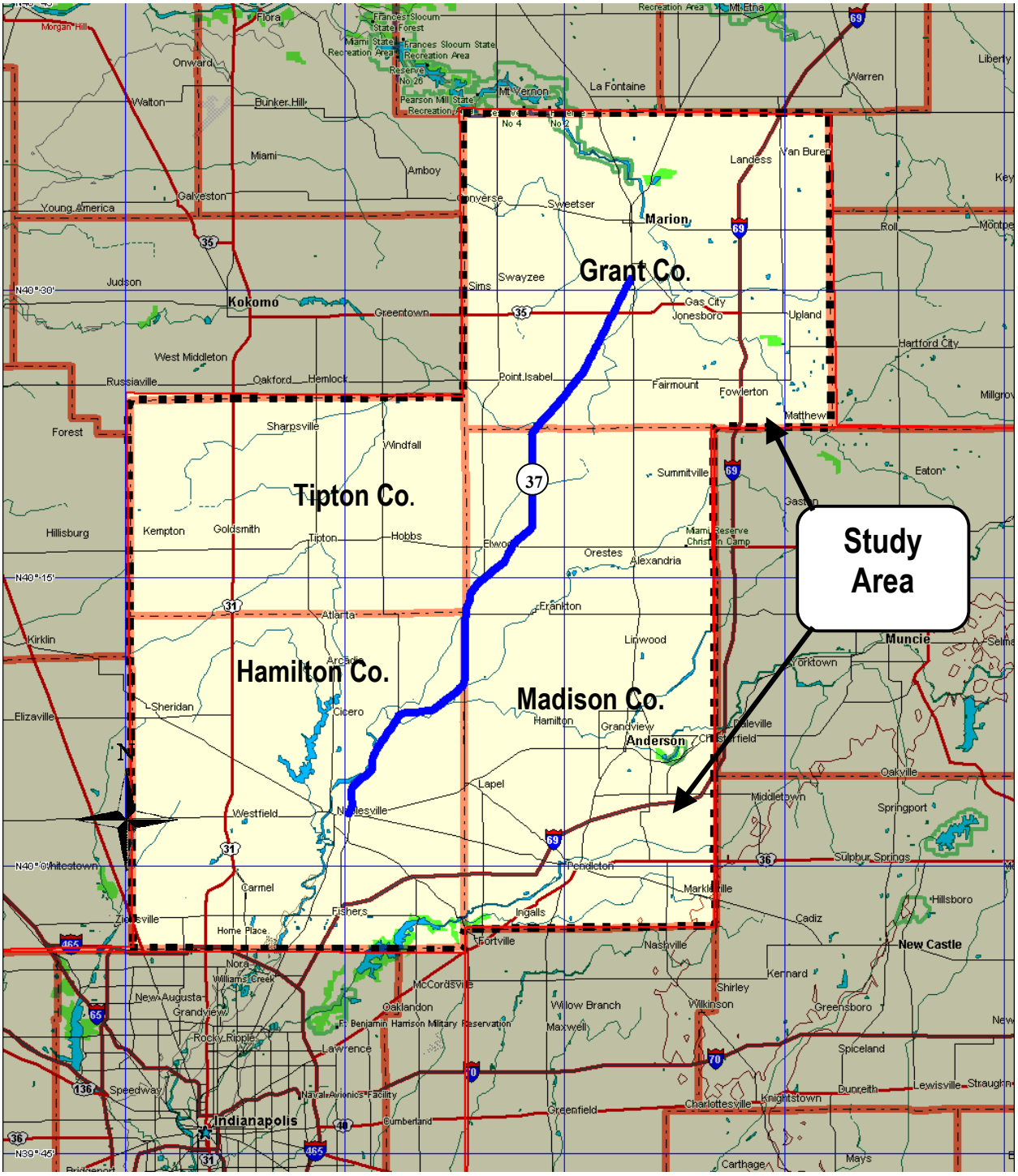
TABLE OF CONTENTS 1

FIGURE 1.1.2 REGIONAL MAP ILLUSTRATING STUDY AREA BOUNDARIES 2

FIGURE 1.3.1 LOCATIONS OF KNOWN HIGHWAY DEFICIENCIES 3

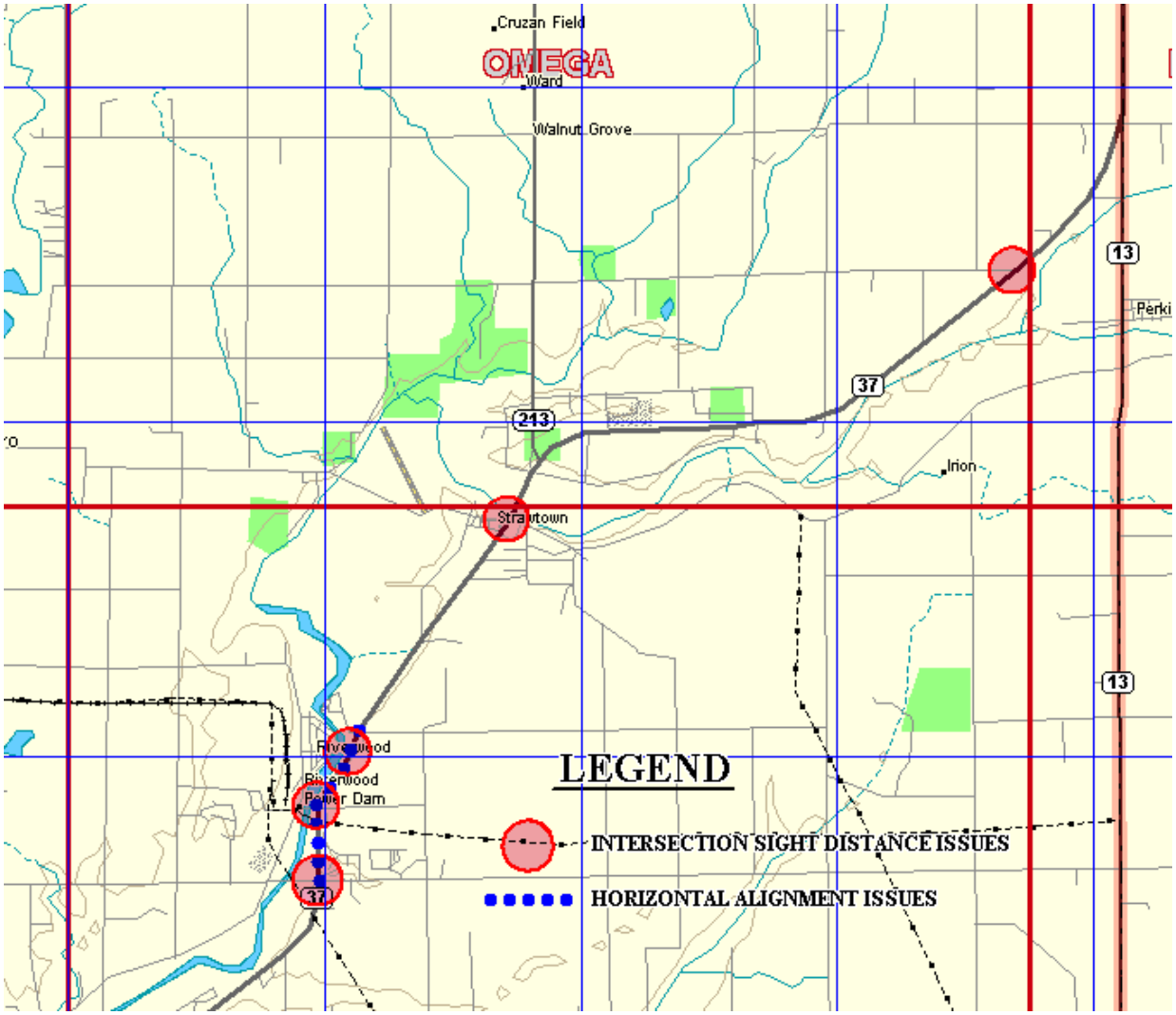
FIGURE 3.0.1 MAP OF SEGMENTS FOR CRASH ANALYSIS 4

Figure 1.1.2
Regional Map Illustrating Study Area Boundaries



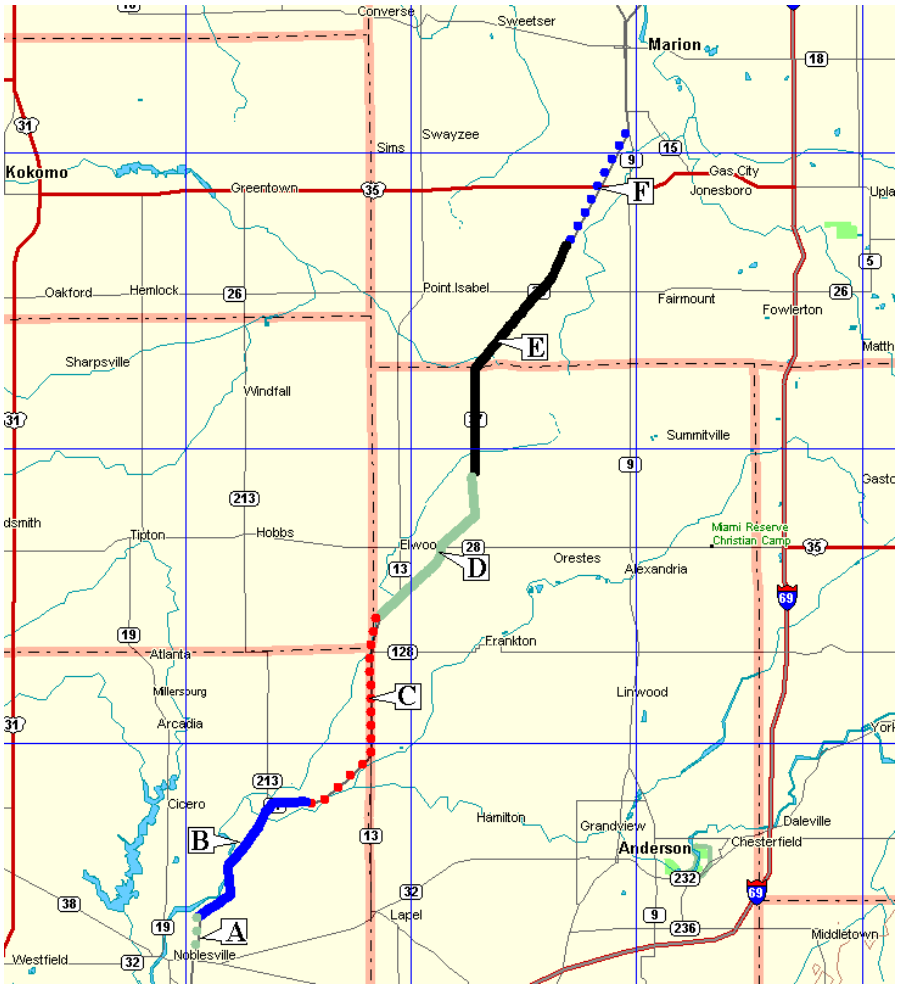
Source: DeLorme 3-D TopoQuads, 1999

Figure 1.3.1
Locations of Known Highway Deficiencies



Source: DeLorme 3-D TopoQuads, 1999

Figure 3.0.1
Map of Segments for Crash Analysis



Source: DeLorme 3-D TopoQuads, 1999